

1                   **MOVING-LOOP ADVERTISEMENT DEVICE**  
2                   **WITH SELF STOPPING AND SMOOTHING ELEMENTS**

3                   BACKGROUND OF THE INVENTION

4           1. Field of the Invention

5                 The present invention relates to a moving-loop advertisement display  
6                 device, and more particularly to a device that automatically displays and changes  
7                 pictures for the purpose of demonstrating advertisement information, news  
8                 announcements etc.

9           2. Description of Related Art

10               With reference to Fig. 13, a conventional two-dimensional (2D) image  
11               display device has a rolling screen (80) rotatably surrounding a transmission rod  
12               (81) and a driven rod (82). The rolling screen (80) can be printed with several  
13               pictures, images or slogans as required by the advertisers. While the  
14               transmission rod (81) is activated, the rolling screen (80) is able to move  
15               upward/downward based on the rotating direction of the transmission rod (81).  
16               The rolling screen (80) is thus able to present different patterns. However, with  
17               the rotating of the transmission rod (81), wrinkles may gradually occur on the  
18               surface of the rolling screen (80) as shown in the drawing. Finally, the whole  
19               rolling screen (80) becomes crumpled and can not maintain in its original  
20               smooth state, which results in that the considerable efforts spent by  
21               manufacturers and advertising agencies in refining the promotion of the product  
22               are impaired. Another problem of the image display device is that the rolling  
23               screen (80) always keeps rotating. For an advertisement viewer, all these  
24               information or pictures on the rolling screen (80) becomes difficult to read.

1           Therefore, it is desired to provide a novel advertisement device to  
2        obviate the aforementioned drawback.

3        SUMMARY OF THE INVENTION

4           The main objective of the present invention is to provide an  
5        advertisement device that drives a rolling screen with advertisement, posters,  
6        news, images etc provided thereon as the advertisement, wherein the picture  
7        changing device of the present invention utilizes a sensor to detect labels formed  
8        on the rolling screen thus to stop the screen at proper positions to demonstrate  
9        the advertising content.

10          Another objective of the present invention is to provide an  
11        advertisement device using a transmission device to prevent the occurrence of  
12        wrinkles in the rolling sheet while it is rotating.

13          Other objects, advantages and novel features of the invention will  
14        become more apparent from the following detailed description when taken in  
15        conjunction with the accompanying drawings.

16        BRIEF DESCRIPTION OF THE DRAWINGS

17          Fig. 1 is a perspective view of a first embodiment of a moving-loop  
18        advertisement display device in accordance with the present invention;

19          Fig. 2 is a plan view of the moving-loop advertisement display device of  
20        Fig. 1;

21          Fig. 3 is an enlarged perspective view showing an optical sensor of the  
22        moving-loop advertisement display of Fig. 1;

23          Fig . 4 is a cross sectional bottom view showing an optical sensor being  
24        mounted in a cover of the moving-loop advertisement display of Fig. 1;

1           Fig. 5 is a bottom plan view of the driving roller in the moving-loop  
2 advertisement display of the present invention;

3           Fig. 6 is a perspective view of a second embodiment of a moving-loop  
4 advertisement display device in accordance with the present invention;

5           Fig. 7 is a plan view of the moving-loop advertisement display device of  
6 Fig. 6;

7           Fig. 8 is a plan view of a third embodiment of the moving-loop  
8 advertisement display device of the present invention;

9           Fig. 9 is a plan view of a fourth embodiment of the moving-loop  
10 advertisement display device of the present invention;

11          Fig. 10 is a perspective view showing the connection of a motor and a  
12 roller in accordance with the present invention;

13          Fig. 11 is a lateral side plan view showing the moving-loop  
14 advertisement display device of Figs. 1 to 9 of the present invention;

15          Fig. 12 is a lateral side plan view showing a fifth embodiment of an  
16 advertisement display device with three rollers; and

17          Fig. 13 is a plan view of a conventional advertisement device.

18 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

19          With reference to Figs. 1-5, a first embodiment of the moving-loop  
20 advertisement device in accordance with the present invention comprises a rod  
21 assembly, a driving device and a display screen (30). The rod assembly is  
22 composed of a driving roller (10) and a driven roller (20) handed by the display  
23 screen (30). A motor (40), as the driving device, connects to one end of the upper  
24 rod (10) and is able to be automatically and intermittently actuated at

1 predetermined times. A cover (60) is further mounted on the driving roller (10),  
2 where said motor (40) is attached to the inner surface of one end of the cover (60).  
3 A position sensor (70), for example an optical sensor in this embodiment, is  
4 installed in an opposite end of the inner surface of the cover (60) and controlled  
5 by a control box disposed in the cover (60). The optical sensor (70) includes a  
6 signal emitting element (701) and a signal receiving element (702) apart from  
7 the signal emitting element (701). The edge of the display screen (30) is just  
8 positioned between the signal emitting element (701) and the signal receiving  
9 element (702) as shown in Fig. 4.

10 The display screen (30) forms a closed loop and simultaneously  
11 surrounds the driving roller (10) and the driven roller (20). Preferably, the  
12 display screen (30) is fabricated by a curtain or material pervious to light, on  
13 which plural advertisement segments represented by pictures, patterns or text are  
14 attached or printed. Several labels (31) are formed along one edge of the display  
15 screen (30), where these labels (31) may be created by dark ink printed on the  
16 display screen (30).

17 When the activated motor (40) drives the driving roller (10) to rotate, the  
18 driving roller (10) transmits the display screen (30) to move upward, at the same  
19 time the driven roller (20) is driven by the display screen (30). At the time that  
20 any label (31) passes through the optical sensor (70), the emitted optical signal is  
21 unable to emit through the display screen (30) and obstructed by the label (31)  
22 thus generating a signal for pausing the motor (40) with a short term. During the  
23 pause period, the display screen (30) could demonstrate a complete  
24 advertisement segment.

1           With reference to Figs 6 and 7, a second embodiment of the moving-  
2   loop advertisement device in accordance with the present invention is  
3   substantially the same as the first one. The second embodiment also comprises a  
4   rod assembly, a driving device, a display screen (30). A tension adjustment  
5   device is further added in the embodiment.

6           The rod assembly is composed of a driving roller (10) and a driven roller  
7   (20). A motor (40), as the driving device, connects to one end of the upper rod  
8   (10) and is able to be automatically and intermittently actuated at predetermined  
9   times.

10          The tension adjustment device in the present invention can be  
11   implemented by either or both of a coil (50) formed on the driven roller (20) and  
12   helical ribs (11) formed on the driving roller (10). The coil (50) is twisted around  
13   the driven roller (20), where the two ends of the coil (50) tightly abut against two  
14   enlarged distal ends (21)(21') of the driven roller (20). It is noted that the coil (50)  
15   is formed to have two segments with opposite twisting directions, i.e. clockwise  
16   and counter-clockwise directions.

17          The helical ribs (11) are raised from and wound around the surface of the  
18   driving roller (10) similar to the thread on a screw but with two portions having  
19   opposite winding directions, where the opposite winding directions of the helical  
20   ribs (11) are corresponding to the opposite twisting directions of the coil (50)  
21   around the driven roller (20).

22          The display screen (30) forms a closed loop and simultaneously  
23   surrounds the driving roller (10) and the driven roller (20). Preferably, the  
24   display screen (30) is fabricated by a curtain or translucent thin film etc, on

1 which the desired pictures, patterns or text are attached or printed. Along one  
2 edge of the display screen (30), several labels are created.

3 When the activated motor (40) drives the driving roller (10) to rotate, the  
4 driving roller (10) transmits the display screen (30) to move upward, at the same  
5 time the driven roller (20) is driven by the display screen (30). Meanwhile, two  
6 outward tension forces with opposite directions (denoted with arrows A and B)  
7 occur because of the opposite twisting direction of the coil (50) and the helical  
8 ribs (11). The opposite forces will gently tug the screen outwardly and keep the  
9 surface of the display screen (30) smooth and prevent the occurrence of wrinkles.  
10 Preferably, the driving roller (10) is formed with the helical ribs (11) thereon as  
11 shown in Fig. 6. However, even when there is only the coil (50) twisted around  
12 the driven roller (20) and the driving roller (10) is plain, the coil (50) is still able  
13 to generate opposite tension forces to maintain a smooth rolling motion.

14 With reference to Fig. 8, the structure of the driving roller (10) and the  
15 driven roller (20) are modified to become extendable. The driving roller (10) is  
16 composed of a hollow central tube (12) with two openings through which a first  
17 rod (13) and a second rod (14) respectively insert into the central tube (12). The  
18 joint between the two rods (13) and the central tube (12) is through the use of two  
19 well known bushings (15)(15'). By rotating either of the bushings (15)(15'), the  
20 respective rod (13)(14) is released from the central tube (12) so that the rod  
21 (13)(14) can be pulled out from or pushed into the central tube (12). Through the  
22 foregoing adjustment, the length of the driving roller (10) can meet the desired  
23 specification.

24 The helical ribs (11), with opposite winding directions, are still formed

1 on the surface of the hollow central tube (11). However, it is noted that a first coil  
2 (132) and a second coil (142) respectively wind around the first rod (13) and the  
3 second rod (14). Further, the twisting direction of the first coil (132) is the same  
4 as that of the left half portion of the helical ribs (11) near the first coil (13).  
5 Similarly, the right half portion of the helical ribs (11) and the second coil (142)  
6 have the same winding direction.

7 The driven roller (20) is substantially the same as the driving roller (10)  
8 of Fig. 6, where the modification is that the helical ribs (11) are replaced with the  
9 coil (50) winding around the central tube (22). The twisting directions of the left  
10 and right half parts of the coil (50) are respectively the same as the first coil (232)  
11 and the second coil (242).

12 With reference to Fig. 9, the cover (60) is mounted on the driving roller  
13 (10). Since the length of the driving roller (10) is adjustable, the cover (60) is  
14 constructed by a center segment (61) and two extendable segments (62)(63) each  
15 of which movably extends from one end of center segment (61) and is secured  
16 via a fastener (64).

17 With reference to Fig. 10, as mentioned above, the motor (40) is able to  
18 connect to the driving roller (10) as shown in Fig. 6 or to the rod (14) as shown in  
19 Fig. 8. For whichever embodiment, the end of the roller (10) or rod (14) for  
20 connection to the motor (40) is formed as an enlarged end from which several  
21 protrusions are provided to insert in holes on the motor (40).

22 The lateral view for each foregoing embodiment is illustrated and  
23 schematically presented in Fig. 11. However, with reference to Fig. 12, the single  
24 driven roller (20) is replaced with three driven rollers (20a, 20b and 20c)

1 configured to form a triangular arrangement. Two rollers (20b, 20c) placed in  
2 parallel are at the lowest position, and the other one (20a) is placed between the  
3 driving roller (10) and the two lowest rollers (20b, 20c). The display screen (30)  
4 sequentially passes through the driving roller (10), one of the two lowest rollers  
5 (20c), the middle roller (20a), the other one of the two lowest rollers (20b) and  
6 then back to the driving roller (10). The purpose of such an arrangement is to  
7 increase the length of the display screen (30) thus allowing more advertisement  
8 information been formed thereon.

9           In conclusion, the present invention utilizes the helical ribs (11) or the  
10 coil (50) with opposite winding directions as a spiral transmission means to  
11 generate opposite tension forces. The tension forces with opposite directions will  
12 keep the surface of the rolling screen (30) in a smooth flat status while the screen  
13 is rolling. Such a transmission means may be provided on either of the driving  
14 roller (10) or the lower roller (20), or preferably on both.

15           It is to be understood, however, that even though numerous  
16 characteristics and advantages of the present invention have been set forth in the  
17 foregoing description, together with details of the structure and function of the  
18 invention, the disclosure is illustrative only, and changes may be made in detail,  
19 especially in matters of shape, size, and arrangement of parts within the  
20 principles of the invention to the full extent indicated by the broad general  
21 meaning of the terms in which the appended claims are expressed.